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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/877,546	CLIFTON ET AL.	
	Examiner	Art Unit	
	Andrew Schechter	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *21-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,16-19 and 31-38* is/are rejected.

7)☒ Claim(s) *12-15 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-20 and 31-38 drawn to an image projection apparatus having a panel diagonal dimension and effective source dimension having particular relationship, classified in class 349, subclass 5.

II. Claims 21-30, drawn to method of modifying a direct view LCD panel to provide an LCD light projection panel and such a modified projection apparatus, classified in class 349, subclass 187.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the method and device of Invention II can be used without the particular relationship which defines Invention I. The subcombination has separate utility such as an image projection apparatus not made using the particular "modifying" technique of Invention II.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

The search required for Invention I is for a device having particular structural features; the search required for Invention II is for a method of modifying a device and such a modified device.

4. Applicant's election with traverse of Group I in Paper No. 6 is acknowledged. The traversal is on the ground(s) that claims 27-30, being apparatus claims, should be put in Group I rather than Group II. This is not found persuasive because the restriction was not done on the basis of apparatus vs. method of making the apparatus, but the combination-subcombination discussed above. Claims 27-30 are indeed apparatus claims, but in the examiner's opinion their subject matter more closely matches that of Group II. This is due to the fact that claim 27 recites an image projection apparatus made of an LCD panel "that is intended for direct viewing of images", which closely links it to Group II.

The requirement is still deemed proper and is therefore made FINAL.

5. Claims 21-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected group, there being no allowable generic or

linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 6.

Specification

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

7. Claim 18 is objected to because of the following informalities: if there is only 1 arc lamp (as in the amended claim 17), the claim becomes unclear. It is assumed that the claim is meant to include the limitation "the light source includes more than 1 arc lamp and further includes a fold mirror...". Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 32-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 32 recites "the effective source size being very small relative to the panel size", a relative comparison which is ill-defined, in contrast to the 1:50 (2%) relative comparison which is recited in claim 1. There is a wide range of relative sizes for lamps

and LCD panels in the prior art, ranging from about 1:1 to larger than 1:50, so the relative comparison in claim 32 makes its scope unclear. For examining purposes it is assumed that 1:50 is required, as for claim 1.

Claims 33-38 depend on claim 32.

10. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "optical element" does not seem to be defined sufficiently to make the scope of this claim clear. A "projection lens" which consists of a collection of lenses, filters, holders, etc. could be taken as a single "optical element", or could be counted up in a variety of ways. Does the applicant consider any object, not integrally formed with another, through which the light passes, to be a separate "optical element"? Or is the number of individual lenses in the "projection lens" considered to be the number of optical elements?

11. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phase "a cone angle that is less than about ±6 degrees" is unclear. The examiner interprets this to mean that the beams diverge from the horizontal by 6 degrees above and 6 degrees below the axis, so the angle of divergence is 12 degrees.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-3, 17, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by *Clarke,* U.S. Patent No. 5,623,349.

Clarke discloses [see Fig. 1, for instance] a high performance image projection apparatus comprising a light source [10] having an effective source size [col. 10, lines 3-8, arc lamp with 1 mm arch length] and generating at least a principal ray [shown in Fig. 1], and an LCD panel [20] for receiving the principal ray and generating an image [onto screen 31], the LCD panel having a panel diagonal dimension [col. 10, lines 3-8, 75 mm] of such a size that the effective source size is two percent or less than the panel diagonal dimension. Claim 1 is therefore anticipated.

The effective source size is 1 mm, so claim 2 is anticipated. The panel diagonal dimension is 75 mm, so claim 3 is anticipated. The light source includes 1 arc lamp, so claims 17 and 31 are anticipated.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 9, 10, 32, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Clarke*, U.S. Patent No. 5,623,349 as applied to claim 1 above.

Clarke also discloses an LCD panel receiving video signal information [col. 4, line 57] to generate image-carrying light, a light bundle [see Fig. 1] including a principal light ray, an optical element [11, 14-16] directing the light bundle to the LCD panel such that the principal light ray is set at an angle of incidence on the LCD panel, the effective source size being very small relative to the panel size [col. 10, lines 2-3] and the angle of incidence being set to a value to establish for an image projected by the image-carrying light an improved contrast ratio [col. 5, lines 18-21]. *Clarke* discloses that the projection system of Fig. 1, including the relative size of source and panel and the angle of incidence of the light, achieves an improved contrast ratio over a particular prior art device [col. 5, lines 18-21], but is silent on the actual contrast ratio of the device.

The examiner takes official notice that having a high contrast ratio is a well-known goal in the LCD art, so it would be obvious to one of ordinary skill in the art to make the contrast ratio be greater than about 1000:1, motivated by the desire to improve the display quality by having a high contrast ratio. This is particularly true considering that *Clarke's* structure explicitly aims for a high contrast ratio and meets the structural limitations of claim 32, structure about which the applicant's specification states "employing large LCD panel ... and small light source ... achieves the smallest

illumination cone angle ... and, therefore, the best possible contrast ratio" [p. 13, paragraph 59]. Claim 32 is therefore unpatentable.

Clarke discloses a projection lens [30], so claim 36 is also unpatentable.

Clarke does not disclose the operational life of the LCD panel before substantial color degradation, nor the resolution of the LCD panel. Similar to the above argument, the examiner takes official notice that long life and high resolution are well-known goals in the LCD art, so it would be obvious to one of ordinary skill in the art to meet the limitations of these claims, motivated by the desire to improve the display quality with high resolution and make it last longer. Claims 9 and 10 are therefore unpatentable.

16. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Clarke*, U.S. Patent No. 5,623,349 as applied to claim 1 above, in view of *Shimada,* U.S. Patent No. 5,710,609.

Clarke discloses that the LCD panel has thin film transistors [col. 10, line 22], but is silent on whether they are amorphous silicon TFTs. *Shimada* discloses using amorphous silicon TFTs in an analogous projection LCD system. It would be obvious to one of ordinary skill in the art to use amorphous silicon TFTs, motivated by *Shimada's* teaching that amorphous silicon TFTs are among those types of TFTs which "are all suitable for use as a TFT" in such devices [col. 6, lines 10-16]. Claim 8 is therefore unpatentable.

17. Claims 1-7, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ogino*, U.S. Patent No. 5,758,940 in view of *Toide et al.,* U.S. Patent No. 5,135,300.

Ogino discloses [see Fig. 1a] a high performance image projection apparatus comprising a light source [1] having an effective source size and generating a principal ray, and an LCD panel [3] for receiving the principal ray and generating an image, the LCD panel having a panel diagonal dimension [250 mm, col. 1, line 22]. *Ogino* is silent on the effective source size of the light source, so does not disclose that it is 2% or less of the panel diagonal dimension (that is, 5 mm or less).

Toide discloses a 5 mm light source "is conventionally used as a light source" [col. 2, lines 46-48]. Further, *Toide* explains that such a size is chosen to balance the needs to be "as close to a point source as possible and ... [have] a sufficient life necessary for the apparatus" [col. 2, lines 28-45]. It would have been obvious to one of ordinary skill in the art to use such a conventional light source, motivated by the teaching of *Toide* that sources of this size have been "conventionally designed and developed" to optimize this considerations. [The examiner notes that *Toide* proposes another lighting means as an improvement over this; however, this "teaching away" does not make the combination unobvious. First, "a known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use" [see MPEP 2145] and second, the references do not explicitly teach away from the combination.] Claim 1 is therefore unpatentable.

The effective source length is between 1 and 7 mm, so claim 2 is unpatentable. The panel diagonal is greater than 50 mm, so claim 3 is unpatentable. The panel diagonal is 250 mm, which puts it in the category of typical direct view panel sizes (~10

inches or more), as opposed to typical projection cell panel sizes (a few centimeters or less), so it is "about 380 millimeters" and claim 4 is unpatentable.

Ogino does not disclose the magnification ratio of the projection lens. Since the panel diagonal is 250mm, a magnification between 4x and 10x would produce an image on the screen between 1 and 2.5 meters in diagonal. The examiner takes official notice that it is well-known to project images in this size range [examples being shown by *Ogino* in Figs. 22-24, col. 15], so it would have been obvious to one of ordinary skill in the art to use a magnification between 4x and 10x, motivated by the desire to project an image sized appropriately for typical conference room projection screens and home theatre-style rear projection systems. Claims 5 and 6 are therefore unpatentable. The projection lens in *Ogino* includes 5 or fewer optical elements [and based on the statements of the specification, p. 11-12, it appears the applicant believes more elements are necessary primarily when the panel size is smaller than in *Ogino*] so claim 7 is also unpatentable. Likewise, the examiner takes official notice that use of a projection screen and rear screen projector arrangement [as in *Ogino*, Figs. 22a,b] is well-known, and it would have been obvious to one of ordinary skill in the art to set up such an arrangement for the above LCD projector, motivated by the commercial value of such home theatre-style systems. Claim 11 is therefore unpatentable.

Ogino discloses that the angle of divergence must be about 0.25 rad (~14 degrees) or less [col. 1, lines 49-50] and the smaller the better, since this results in a higher contrast ratio. The examiner understands this to be a ±7 degree cone angle, which is "about ±6 degree or less", so claim 16 is also unpatentable.

18. Claims 17-19 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Clarke*, U.S. Patent No. 5,623,349 as applied to claims 1 and 32 above, in view of *Bartlett et al.*, U.S. Patent No. 6,545,814.

Clarke does not disclose the additional limitation of multiple light emitting devices. *Bartlett* discloses [see Fig. 4] using multiple light emitting devices, combined by the integrating rod [400]. It would have been obvious to one of ordinary skill in the art to use multiple light emitting devices optically combined to establish the effective source size using *Bartlett*'s integrating rod, motivated by *Bartlett's* teaching that this "provides a long-life, high luminance, high flux light source" [col. 2, lines 36-37]. Claim 33 is therefore unpatentable.

The light bundle using *Bartlett's* rod and the LCD panel are generally the same geometric shape [col. 3, lines 8-9]. [This is made explicit in *Bartlett* for the first embodiment, and clearly applies equally well to the others.] Claim 34 is therefore unpatentable. The light source using *Bartlett's* rod [400] further comprises multiple light reflecting elements [410, 412, etc.], coacting to direct light rays to form a substantially collimated light bundle, so claim 35 is also unpatentable.

Using *Bartlett's* rod [400], there are 4 arc lamps, each with a fold mirror [410, etc.], coacting to direct light rays to form a substantially collimated light bundle, in pinwheel shaped mirror configuration, so claims 17-19 are unpatentable.

19. Claims 32, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ogino*, U.S. Patent No. 5,758,940 in view of *Toide et al.,* U.S. Patent No. 5,135,300 as applied to claims 1 and 5 above.

Ogino also discloses an LCD panel receiving video signal information [inherent, this is what makes the images] to generate image-carrying light, a light bundle [see Fig. 1a] including a principal light ray, an optical element [2] directing the light bundle to the LCD panel such that the principal light ray is set at an angle of incidence on the LCD panel, the effective source size being very small relative to the panel size [as discussed previously] and the angle of incidence being set to a value [here zero] to establish for an image projected by the image-carrying light a contrast ratio. *Ogino* discusses achieving high contrast and doing so by reducing the angle of divergence (cone angle), but is silent on the actual contrast ratio of the device.

The examiner takes official notice that having a high contrast ratio is a well-known goal in the LCD art, so it would be obvious to one of ordinary skill in the art to make the contrast ratio be greater than about 1000:1, motivated by the desire to improve the display quality by having a high contrast ratio. This is particularly true considering that *Ogino's* structure explicitly aims for a high contrast ratio and meets the structural limitations of claim 32, structure about which the applicant's specification states "employing large LCD panel ... and small light source ... achieves the smallest illumination cone angle ... and, therefore, the best possible contrast ratio" [p. 13, paragraph 59]. Claim 32 is therefore unpatentable.

As discussed above in the context of claim 5, it would have been obvious to one of ordinary skill in the art to have a projection lens with magnification less than about 10x. Claims 36 and 37 are therefore unpatentable.

Allowable Subject Matter

20. Claims 12-15 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. Claim 38 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

22. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the device recited by claim 12, in particular the additional limitation of an input Fresnel lens that receives and diffracts the principal ray from the light source causing it to propagate through the LCD panel at an optical ray angle, giving a contrast ratio of at least 1000:1. Claim 12 would therefore be allowed if rewritten appropriately, as would claims 13-15 which depend on it. Similarly, claim 38 recites the optical element comprising a Fresnel lens where the principal ray enters the Fresnel lens at a position offset from the optical center to set an angle of incidence of the principal light ray on the LCD panel, an additional limitation which is also not disclosed by the prior art, so it would be allowable if rewritten appropriately.

The prior art does not disclose the device recited by claim 20, in particular the additional limitation of a flyseye lens array light homogenizer system that receives the substantially collimated light bundle and produces homogenized light rays. Claim 20 would therefore be allowable if rewritten appropriately.

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,273,570 to *Clifton et al.* is the patent resulting from the parent application.

U.S. Patent No. 5,836,664 to *Conner et al.,* made of record by the applicant, discloses a Fresnel lens on the output of the LCD panel, rather than on the input, having a center offset from the principal ray, in order to improve contrast.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (703) 305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

AS
Andrew Schechter
30 October 2003

T. Chowdhury
Primary Examiner